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1. Iskusnykh I.Y., Popova T.N.

The role of magnetosomes in cellular homeostasis disorder and development of pathology.

Literature data on magnitosomes, the nanocrystals formed during natural biomineralization have been summarized. Special attention is paid to magnitosome effect on physiological and biochemical processes, impairments of cell homeostasis and development of various pathologies. It is suggested that the increase in quantity and sizes of magnetosomes, spatial rearrangement, and modification of their crystalline substance exert substantial effect on development of pathological processes.

DOI: 10.18097/pbmc20105605530

2. Tedtoeva A.I., Dzugkoeva F.S., Mozhaeva I.V., Dzugkoev S.G.

Lipid peroxidation, activity of Na+,K+-ATPase and exzymes of antioxidant defence in rats with nephropathy induced by cobalt chloride.

Chronic parenteral administration of cobalt chloride (6 mg/kg) to male rats for 2 weeks or 1 month was accompanied by activation of lipid peroxidation (LPO), a decrease of superoxide dismutase activity and an increase of catalase activity. The membrane toxic action also resulted in a decrease of cortical and medullar Na+,K+-ATPase activity of kidneys, and the decrease in renal functions (glomerular filtration, renal water reabsorption, spontaneous diuresis, electrolyte excretion).

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3. Rizvi S.I., Srivastava N.

L-Cysteine Influx in Type 2 Diabetic Erythrocytes.

Erythrocyte oxidative stress has been implicated in the pathogenesis of diabetes mellitus, and the deficiency of antioxidant defense by the glutathione (GSH) pathway is thought to be one of the factors responsible for development of complications in diabetes. Erythrocytes require L-cysteine for the synthesis of GSH and the rate of synthesis is determined only by L-cysteine availability. In the present study we have found that the L-cysteine influx in erythrocytes from type 2 diabetic patients was significantly lower compared to age-matched controls. The decreased influx may be one of the factors leading to low GSH concentration observed in type 2 diabetes. Since L-cysteine is the limiting amino acid in GSH synthesis, any strategy aimed to increase L-cysteine influx in erythrocytes may be beneficial for type 2 diabetic patients.

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4. Kutyreva M.P., Ulakhovich N.A., Usmanova G.Sh., Kutyrev G.A., Glushko N.I., Khaldeeva E.V.

Biochemical activity hyperbranched poliol Boltorn H20 and polycarboxyBoltorn H20 in relation to aspartic proteinase of Candida albicans.

Hyperbranched polyol Boltorn H20 and polycarboxyBoltorn H20 synthesized on its multifunctional nanoscaffold influence catalytic activity of aspartic proteinase Candida albicans (C. alb.). The results of study catalytic activity proteinase C. alb. in relation to hemoglobin at presence Boltorn Đ•20 show, that the effect of activation is mainly observed. The inhibition effect much more poorly also has dot character. PolycarboxyBoltorn H20 render activating effect in area of high concentration (1Ã—10-3 - 5Ã—10-4 M), however this effect is stronger (140%). A kinetic parameters enzyme proteolysis of hemoglobin (the maximal speed (Vm) and Mikhaelis constant (Km)) are estimated, seeming types are certain and constants at presence Boltorn H20 and policarboxyBoltorn H20 are calculated.

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5. Lelevich S.V., Novokshonov A.A.

Neuromediator systems in some brain regions of rats subjected to morphine intoxication.

The content of neuromediators and its metabolites in the cortex of cerebral hemispheres, in thalamus and brain stem was studied under chronic morphine intoxication (7-21 days). The morphine intake during 7-14 days was accompanied by changes of catecholamine system functioning, which was the most pronounced in the thalamus and the brain stem. These changes included increased secretion of dophamine and noradrenaline, their decrease in the brain tissue, and the increased content of their metabolites. The changes of serotonin and GABA content were less pronounced and included a decrease of serotonin level and the increase of the GABA content in different periods of narcotization.

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6. Ivanova A.V., Stunzhas N.M.

Functional state of rat brain mitochondria at hypoglycemia convulsive syndrome and different ways of its arresting.

Respiratory and phosphorylation functions of rat brain mitochondria was studied under conditions insulin shock and after its treatment with glucose or glutamate (in combination with inhalation of hypercapnic gas mixture - air enriched with 7% Đ¡ĐŽ2). Certain differences in the effects of the applied agents were found. Phosphorylation ability of mitochondria did not reach the normal level even one day after both ways of convulsive state treatment. Some respiratory parameters suggest that unfavorable changes in the respiratory chain functioning mainly occur at the respiratory chain complex I.

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7. Mehtiev A.R., Fedchenko V.I., Tkachev Ya.V., Timofeev V.P., Misharin A.Yu.

Regulation of cholesterol biosynthesis and metabolismin Hep G2 cells by Î´8(14)-15-ketoergostane derivatives.

The comparative study of effects of 5Î±-cholest-8(14)-en-15-on-3Î²-ol (I), (22E)-5Î±-ergosta-8(14),22-dien-15-on-3Î²-ol (II), (22S,23S)-22,23-oxido-5Î±-ergost-8(14)-en-15-on-3Î²-ol (III) and (22R,23R)-22,23-oxido-5Î±-ergost-8(14)-en-15-on-3Î²-ol (IV) on HMG-CoA reductase, CYP27A1 and CYP3A4 genes expression in Hep G2 cells was performed. In the contrast to 15-ketocholestane derivative (I), 15-ketoergostane derivatives (II - IV) decreased the HMG- CoA reductase mRNA level; (22R,23R)-22,23-oxido-5Î±-ergost-8(14)-en-15-on-3Î²-ol (IV) significantly increased CYP3A4 mRNA level (320% from control). Ketosterol (II) was found to be a more potent inhibitor of cholesterol biosynthesis in Hep G2 cells at a prolong incubation, compared with ketosterol (I). The side chain conformation of compounds (I) - (IV) was evaluated by computational modeling; the correlation between biological activity of these compounds and conformational flexibility of their side chains was found. The results obtained indicated that Î”8(14)-15-ketoergostane derivatives may be used as a sterol biosynthesis and metabolism regulators in liver cells.

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8. Ryazantseva N.V., Zhavoronok T.V., Stepovaya E.A., Starikov Yu.V., Bychkov V.A.

The role of nitric oxide synthesis induction and inhibition in regulation of blood neutrophil cell death during oxidative disbalance.

Modeling oxidative stress in vitro with 5Ð¼Ðœ H2O2 has demonstrated a protective role of nitric oxide on realization of constitutional blood neutrophil cell death. The NO-synthase inductor L-arginine and the inhibitor of nitric oxide synthesis, L-NAME, influenced on the amount of annexin-positive cells, the content of Bax protein, reactive oxygen species, cyclic nucleotides, and calcium homeostasis in neutrophils under conditions realizing programmed death during oxidative stress in vitro and under acute inflammation. During oxidative stress L-arginine normalized the increased intracellular Ca2+ level and the cÐ•ÐœP/cGÐœP ratio due to increase of cGÐœP level, stabilized metabolism and prolonged neutrophil life. During acute inflammation NO induction was insufficient for limitation of Ca2+ release into cytosol and for onset of the apoptotic effect; blockade of NO synthesis deteriorated this situation by activating neutrophil apoptosis due to the sharp increase in Ca2+ content and reduction of cyclic nucleotides in cytosol. The protective effect of NO on neutrophil cell death during oxidative dysbalance is not associated with regulation of apoptotic protein Bax.

DOI: 10.18097/pbmc20105605587

9. Kostyushov V.V., Bokal I.I., Petrov S.A.

Study of activity of enzymes of antioxidant system of blood at HIV infection.

HIV infection is accompanied by activation of lipid peroxidation, oxidative modification of lipoprotein complexes, and a decrease in activity of antioxidant enzymes (superoxide dismutase (SOD), catalase and glutathione peroxidase (GP)) in blood serum. A significant increase of glutathione reductase observed under these conditions is considered as a function of the antioxidant defence. These changes were already seen at early (symptomless) stages of this disease, however, at manifested forms they were more pronounced.

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10. Svinareva L.V., Glukhov A.I., Zimnik O.V., Bykov I.I., Khorobrykh T.V., Shvets V.I.

Detection of telomerase activity in gastric cancer.

Telomerase activity (TA) was examined in gastric adenocarcinomas and gastric lymphoma using a modified TRAP assay. TA was present in 16 of 18 (89%) gastric adenocarcinomas and in gastric lymphoma, whereas no TA was detected in normal tissue. Almost all samples had "high" and "very high" TA levels. Telomerase is undoubtedly associated with the process of malignant transformation and therefore can be an important marker for diagnostics of gastric cancer.

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11. Dutov A.A., Nikitin D.A., Fedotova A.A.

Hplc determination of plasma/serum homocysteine and cysteine with uv detection and solid-phase extraction on a polymeric sorbent.

Isocratic HPLC determination of plasma/serum homocysteine and cysteine with separation on reversed-phase column and UV detection at 330 nm is proposed. The mobile phase consist of acetonitrile - 0.05 M citrate-phosphate buffer with pH 2.4 - isopropanol (15:85:1, v/v/v). Full separation of cysteine, cysteamine (IS), glutathione and homocysteine was achieved within less than 10 minutes. Reduction of thiols from disulfides was performed by 1,4-dithioerithreitol, and derivatization by with Ellman's reagent [5'5-dithiobis-(2-nitrobenzoic acid)]. After that plasma/serum, containing derivatives of thiols, is cleared and concentrated on cartridge packed with 10 mg of hypercross-linked polystyrene (Purosep-200). Elution from cartridge is made with water-organic solvent (without evaporation and concentration, but without dilution), as well as waterless solvents (with evaporation and concentration). Simplicity, reproducibility in combination with high cleanliness of extracts and sufficient sensitivity (0.4 ng for homocysteine, 2 ng for glutathione and 0.2 ng for cysteine and cysteamine at a signal/noise ratio > 3), make this method suitable for routine clinical application.

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12. Pogorelova T.N., Gunko V.O., Drukker N.A., Linde V.A.

Proteins-markers of placental insufficiency.

The proteomic analysis of the amniotic fluids of women with physiological pregnancy and pregnancy, complicated with placental insufficiency has been carried out on the II and III trimesters. The following difference in protein patterns have been recognized: i) appearance of several proteins lacking in physiological pregnancy; ii) absence of several proteins detectable during physiological pregnancy - hippocalcin-like protein 1, CDC37-like protein, NKG2D ligand 2 (II trimester), CDC37-like protein, NKG2D ligand 2 (III trimester). The established differences in the amniotic fluid spectrum, obviously, have the pathogenetic meaning in the placental insufficiency development. The revealed proteins of distinction may serve as markers of this obstetrical pathology.

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